ON A METHOD OF MAKING INTESTINAL ANASTOMOSIS, WHICH WILL PREVENT SUBSEQUENT CONTRACTION OF THE ORIFICES.

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THE cases are rapidly multiplying in which surgeons have observed the partial or complete obliteration, by cicatricial contraction, of the orifices of communication made by operations for anastomosis of the hollow viscera.

I have myself met with this result in dogs upon which I have operated with the elastic ligature. In one case of anastomosis, made between adjoining coils of the small intestine, I found at the end of three weeks the opening between the two nearly closed, and in several cases of operations between the gall bladder and intestine, the holes made by the ligature had nearly disappeared in the process of healing.

In the human subject, the recurrence of stenosis after operations for the production of anastomosis has been observed as the ultimate effect of all kinds of operations done for that purpose. It has been seen now many times, after operations by the old original method of sewing the edges of the cuts made through the opposing intestines, by two series of sutures, one, namely for the mucous and one for the serous and muscular coats. It has also been met with after operations by Senn's method and in a recent case after the use of the Murphy button. In the case reported by Dr. Keen, of anastomosis produced by the Murphy button, the opening of communication had diminished by one-half in the short period of forty-seven days. These results seem to have occasioned a disagreeable surprise in the profession, and yet they are precisely what might have been foreseen from our knowledge of the effects of the contraction of scars elsewhere. We know very well that wherever there is a raw edge connecting two opposed surfaces, those surfaces will be drawn together and united by the resulting cicatricial contraction. Thus in webbed fingers, it is impossible to prevent the reunion of the fingers after incision unless we break the continuity of the scar by the insertion of flaps of sound tissue and in cleft of the soft palate, operations which have failed to heal by first intention will nevertheless usually heal by granulation, the separated edges being ;drawn again together as the scar advances.

If we ask what is the cause of the contraction of the opening of communication made artificially between any two of the hollow viscera, the answer would seem sufficiently plain. We should expect it to occur whenever the edges of the orifice are in the process of healing left raw and granulating, or whenever, after healing has taken place, that edge of cicatricial tissue becomes irritated by the passage of food or fæces, and turned into a raw sore. When we consider the pathological conditions which must ensue after many of the various operations for intestinal anastomosis, we may indeed wonder that so few cases of

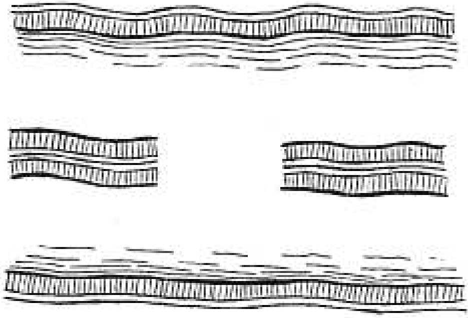


FIG. 1.—Intestinal anastomosis by lateral apposition, showing the broad raw edge.

resulting stenosis are reported. In many methods a granulating wound must be the ordinary effect of the operation. Thus in all operations in which the viscera are brought together in lateral apposition by plates or rings of any kind, there can in the very nature of things be no primary union of the mucous membrane. The intention of the operation is to produce adhesion of the serous surfaces alone, and a wide granulating edge, uncovered by mucous membrane, bounds the entire circumference of the orifice. In the operation by Murphy's button, the button becomes detached by crushing the rim of tissue around the opening of communication until it sloughs and gives way, leaving behind a granulating wound, disposed to close after the nature of such wounds. The old operation of incising the opposed viscera and uniting them with double rows of sutures would seem to offer a better hope of permanency than the newer methods, for if the mucous membranes should chance to heal by first intention the orifice lined by an unbroken tissue would probably be permanent. In how many cases, however, there would be healing of the serous surfaces while the inner line of stitches, under the influence of septic and mechanical lesions, would give way and leave an uncovered and contracting edge, it is impossible to say. While all such orifices, made by any of the hitherto described operations, would be liable to contract and close, it is evident that the danger of closure would be in inverse proportion to the size of the opening. Some surgeons, therefore, have endeavored to secure themselves from failure by making orifices several inches long. It remains to be seen whether this method will prove effective; there may be some doubt also whether such large openings, if permanent, might not so weaken the bowels as to materially interfere with the propulsion of food. It is probable that the same process of gradual closure from cicatricial contraction will be found to take place, however large the opening may be made. In the case of anastomosis between the gall bladder and bowel, a very large opening would often be rendered impossible by the size of a contracted gall bladder. These openings are for several reasons more liable to close completely than similar orifices between two intestines. The flimsy structure of the gall bladder offers less mechanical resistance to contraction than the thicker wall of the gut, the opening is of necessity smaller, and the thin fluid which passes through it does not tend to dilate it, whereas in the intestine the passage of food and fæces must, to a certain, perhaps small extent, have an effect similar to that of a bougie in a urethral structure. I cannot, therefore, agree with Dr. Keen, who rejects Murphy's button for intestinal anastomosis, but encourages its use for cholecystenterostomy. It is my belief, founded on certain experiences with the lower animals, that the most of the fistulæ, made by surgeons between the gall bladder and intestines close completely in a comparatively short time, and I should expect such a result more positively after the use of the Murphy button, with its crushing action, than after an operation in which the two viscera are carefully joined together with sutures.

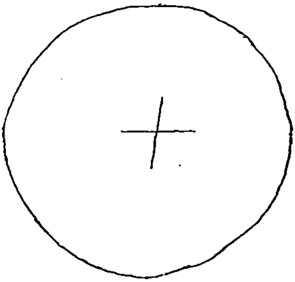


FIG. 2.—Cross-cut through gall making four flaps bladder.

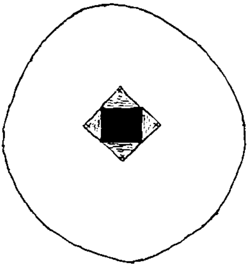


FIG. 3.—The same, with flaps turned back and sutured to the gall bladder, their serous surfaces in apposition.

It is evident that whenever an anastomosis between two viscera has become desirable, it is imperative that it should be permanent for this operation is almost never required for temporary purposes.

It is indicated, as a rule, only in permanent obstructions of the bowel or gall ducts. We use it to overcome a pyloric stenosis, or a biliary obstruction which we can meet in no other way.

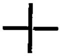
It may be employed, though rarely, in some cases of acute intestinal obstruction, in which we may hope that the contents of the bowel will subsequently pass through the natural channel, restored to its normal condition by the subsidence of inflammation, and yet even in these cases we can never count upon a restoration of the old function of the bowel after the obstruction has been relieved by the establishment of an anastomosis.

For this reason surgeons engaged in this line of work have discovered this possibility of the contraction of these artificial passages with a feeling akin to consternation. Why should we expose the patient to the dangers of such an operation as that for the establishment of an intestinal anastomosis if in a few months our work is to be rendered useless, and the patient plunged again into the old trouble by the closure of the opening.

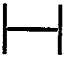
At the last meeting of the American Surgical Association at Buffalo, I presented some specimens of anastomosis made on the lower animals, between the gall bladder and intestine, and between two neighboring coils of intestine, produced by a new operation which will, I believe, overcome this difficulty and make permanent openings, not liable to contraction.

The principle on which the operation is based is the same as that which we make use of in operating for webbed fingers, namely, to break the line of scar by the interposition of sound integument or mucous membrane.

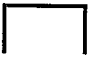
As the edge of the artificial opening contracts by reason of the granulations and scar tissue which line it, I try to replace that tissue with an unbroken mucous membrane which is not subject to contraction. This may be accomplished differently as we have to deal with the gall bladder and intestine or two coils of intestine. In the first instance, when making a cholecystenterostomy I proceed as follows: Exposing the gall bladder, I make a cut in this viscus at its most prominent part and let out the bile. To this cut, I now add other cuts in such a way as to form flaps. These flaps may be made in a variety of forms. We may, for instance, by two cuts crossing each other at right angles make four triangular flaps, thus:



or we may make two flaps, thus:



or content ourselves with one, thus:



In either case, by turning the flaps back on to the gall bladder so as to bring their serous surfaces together and fastening them there with sutures of fine silkworm gut, we secure for the opening in the gall bladder a mucous edge which, according to the method of flap formation adopted, bounds the orifice either completely or in part. Four flaps, cut as described above, will make the most complete result, for the four sides of the orifice will then be composed of the inner surface of the four flaps where they are turned back on themselves as on hinges. The other modes of incision will leave raw edges, adjacent to the mucous edges,

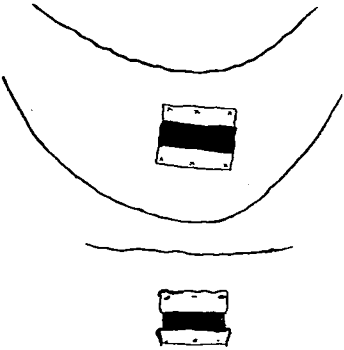


FIG. 3.—Flap made in stomach and small intestine turned back and sutured to serous surfaces.

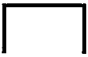
which will inevitably contract and lessen the size of the openings. The flaps thus sutured will soon unite with the gall bladder by adhesive inflammation, and the orifice thus formed could not possibly contract to any great extent.

After the gall bladder is thus prepared an incision is made in the intestine and the serous surface of the gall bladder just above and behind the flaps is sewed to its posterior edge. The gall bladder is then tucked into the intestine so that it projects into its cavity like a nipple, with the newly made opening at its lowest part. By means of numerous sutures, the serous surface of the gall bladder is united all around to the serous surface of the gut. These sutures should be placed in the gall bladder above the ends of the everted flaps, but in the intestine through the edge of the incision.

The result of this operation will be to make an artificial passage from the gall bladder into the intestine, lined with a mucous membrane, which will descend within the nipple-like prolongation to return on its outer surface until it joins the mucous lining of the intestine. What scar there would be would be above the orifice through which the bile would discharge into the intestine, and an obliteration of the passage by its contraction is hardly conceivable.

When the anastomosis is to be made between two coils of intestine we have to proceed in a different manner. We can not very well insert one gut into another, unless, perhaps, when joining the small to the large intestine. In that case the ileum could be inserted into the large intestine in the same fashion as the gall bladder with intestine.

In other cases, as when forming an anastomosis between stomach and jejunum, I first make an incision in the stomach on its lower surface and midway between the two curvatures. At the end of this longitudinal cut I join two transverse cuts thus



making a long flap. Turning this flap back on its attached part as on a hinge, I attach it by means of Lembert sutures to the adjacent serous surface of the stomach. A similar flap is made in the jejunum, but on the opposite side. We have then in each viscus an opening, one edge of which is lined by everted mucous membrane and the other edge of which is raw.

In bringing the viscera together the raw edge of one comes opposite the flap of the other and *vice versa*, and in sewing them together, each raw edge is fastened to the serous membrane of the other viscus just outside of the everted flap. In actual practice, after making the flap in the stomach, I attach the bowel to it before incising it, and thus simplify the procedure.

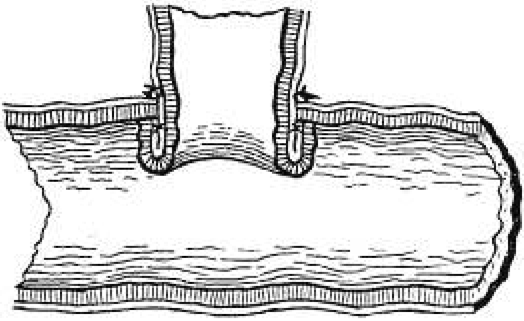


FIG. 4.—The gall bladder turned into the intestine and held there by sutures through the serous and muscular coats.

It is evident that this procedure could be varied indefinitely, provided the object is kept steadily in view of lining the new-made orifice with mucous membrane, and bringing the line of union to a place where its contraction could not produce closure.

These methods of operating are not difficult, neither do they require the expenditure of much time, and I believe that they will prove efficacious in the prevention of subsequent stenosis.